

## Amendments to the Claims

Claim 1 (**Currently Amended**) ~~Method~~ A method for ~~analysing the~~ analyzing a hydrocarbon composition of homogeneous geological strata of a first drilling well through which a well drilling system extends, the drilling producing an effluent, ~~wherein a summary of the contents of a plurality of gaseous hydrocarbons is carried out at various successive depths,~~ the method comprising ~~at least~~:

\_\_\_\_\_ determining, at successive depths, contents of a plurality of gaseous hydrocarbons in the effluent;

\_\_\_\_\_ [[ - ]]establishing, at a substantially identical depth, a plurality of gaseous hydrocarbon content ratios, in pairs, for at least one first depth-range range, the establishing comprising plotting on a plot the content of a first of the gaseous hydrocarbons in the effluent at a given depth versus the content of a second of the gaseous hydrocarbons at the given depth for the successive depths in the at least one first depth range, each data point of the plot corresponding to one of the gaseous hydrocarbon content ratios;

\_\_\_\_\_ [[ - ]]selecting, within the plot, from ~~this the~~ plurality of gaseous hydrocarbon content ratios, a sub-group of reference ratios ~~in order to constitute~~ constituting a signature ~~which that~~ is representative of ~~the~~ a gaseous hydrocarbon composition of the effluent in the at least one first depth range, the signature being formed by at least one straight line which is taken from a group of straight lines, each of the ~~straight-line~~ lines having a given inclination value representing the content of ~~the~~ a first gaseous hydrocarbon ~~relative to~~ as a function of the content of ~~a the~~ second gaseous ~~hydrocarbon,~~ hydrocarbon; and

\_\_\_\_\_ [[ - ]]comparing the signature with at least one reference ~~signatures~~ signature in order to determine the hydrocarbon ~~content~~ composition of the geological ~~stratum~~ strata corresponding to the at least one first depth range.

Claim 2 (**Currently Amended**) ~~A system~~ System for ~~analysing the~~ analyzing a hydrocarbon composition of homogeneous geological strata of a first drilling well through which a well drilling system extends, the drilling producing an effluent, ~~the analysis system comprising at least~~ comprising:

~~\_\_\_\_\_ means for analysing the~~ determining, at successive depths, contents of a plurality of gaseous hydrocarbons of in the effluent and effluent;

~~\_\_\_\_\_ means for storing these contents in accordance with the drilling depth, the analysis system further comprising calculation means which are connected to the storage means and which are capable of calculating~~ establishing, at a substantially identical depth, a plurality of gaseous hydrocarbon content ratios ratios, in pairs, for at least one first depth range, the means for establishing comprising means for plotting on a plot at a substantially identical depth, and means which are capable of displaying the plurality of ratios in the form of a plurality of graphs, each graph representing the content of a first of the gaseous hydrocarbons in the effluent at a given depth versus hydrocarbon in accordance with the content of a second of the gaseous hydrocarbons at the given depth hydrocarbon for at least one depth range, at least one of the graphs from the plurality of graphs representing a signature of the geological stratum for the depth range, characterised in that each graph of the signature is illustrated by a straight line having a given inclination value for the successive depths in the at least one first depth range, each data point of the plot corresponding to one of the gaseous hydrocarbon content ratios;

~~\_\_\_\_\_ means for selecting, within the plot, from the plurality of gaseous hydrocarbon content ratios, a sub-group of reference ratios constituting a signature that is representative of a gaseous hydrocarbon composition of the effluent in the at least one first depth range, the signature being formed by at least one straight line which is taken from a group of straight lines, each of the straight lines having a given inclination value representing the content of the first gaseous hydrocarbon as a function of the content of the second gaseous hydrocarbon; and~~

~~\_\_\_\_\_ means for comparing the signature with at least one reference signature in order to determine the hydrocarbon composition of the geological strata corresponding to the at least one first depth range.~~

**Claim 3 (Currently Amended)** ~~A Analysis-system according to claim 2, further comprising characterised in that the display system can further superimpose~~ means for superimposing the plots graphs corresponding to at least two homogeneous geological strata.

**Claim 4 (Currently Amended)** ~~A computer readable Numerical data structure recorded on a storage medium having a computer program stored thereon for execution for implementation by~~

~~a computer, characterised in that it comprises numerical values of at least a pair of contents of gaseous hydrocarbons, the numerical values being represented on a straight line having a given inclination value corresponding to a depth range and being representative of the signature of a geological stratum~~ the computer program for analyzing a hydrocarbon composition of homogeneous geological strata of a first drilling well through which a well drilling system extends, the drilling producing an effluent, the computer program causing the computer to execute a method comprising:

determining, at successive depths, contents of a plurality of gaseous hydrocarbons in the effluent;

establishing, at a substantially identical depth, a plurality of gaseous hydrocarbon content ratios, in pairs, for at least one first depth range, the establishing comprising plotting on a plot the content of a first of the gaseous hydrocarbons in the effluent at a given depth versus the content of a second of the gaseous hydrocarbons at the given depth for the successive depths in the at least one first depth range, each data point of the plot corresponding to one of the gaseous hydrocarbon content ratios;

selecting, within the plot, from the plurality of gaseous hydrocarbon content ratios, a subgroup of reference ratios constituting a signature that is representative of a gaseous hydrocarbon composition of the effluent in the at least one first depth range, the signature being formed by at least one straight line which is taken from a group of straight lines, each of the straight lines having a given inclination value representing the content of the first gaseous hydrocarbon as a function of the content of the second gaseous hydrocarbon; and

comparing the signature with at least one reference signature in order to determine the hydrocarbon composition of the geological strata corresponding to the at least one first depth range.

Claim 5 (New) A method according to claim 1, wherein the reference signature is formed by a second straight line representing the content of the first gaseous hydrocarbon as a function of the content of the second gaseous hydrocarbon for a second depth range distinct from the first depth range of the same first drilling well.

Claim 6 (**New**) A method according to claim 5, wherein the first straight line almost superimposes the second straight line.

Claim 7 (**New**) A method according to claim 1, wherein the reference signature is formed by a third straight line representing the content of the first gaseous hydrocarbon as a function of the second gaseous hydrocarbon in the effluent of a second drilling well distinct from the first drilling well.

Claim 8 (**New**) A method according to claim 7, wherein the first straight line almost superimposes the second straight line.